

Amendments to the Claims:

This listing of the claim will replace all prior versions, and listings, of the claim in the application:

Listing of Claims:

What is claimed is:

1. (currently amended) A spectrometer, comprising:
  - a source of a primary beam of radiant energy;
  - a beamsplitter fixed in relation to the primary beam, for dividing primary beam into at least first and second energy beams which follow first and second optical paths;
  - a tunable solid-state reference laser coupled to the spectrometer through a filter;
  - at least one return reflector for reflecting the first beam back to the beamsplitter;
  - at least one radiant energy detector; and
  - a control, data acquisition and processing electronic system;
  
2. (currently amended) A spectrometer, comprising:
  - a source of a primary beam of radiant energy;
  - a beamsplitter fixed in relation to the primary beam, for

dividing primary beam into at least first and second energy beams which follow first and second optical paths;  
at least one return reflector for reflecting the first beam back to the beamsplitting means;  
at least one radiant energy detector;  
a control, data acquisition and processing electronic system; and  
a roof reflector rigidly coupled to the beamsplitter for the purpose of folding the second beam by an angle<sup>7</sup>.

3. (currently amended) A spectrometer, comprising:
  - a source of a primary beam of radiant energy;
  - a beamsplitter fixed in relation to the primary beam, for dividing primary beam into at least first and second energy beams which follow first and second optical paths;
  - at least one return reflector for reflecting the first beam back to the beamsplitting means;
  - at least one radiant energy detector;
  - a control, data acquisition and processing electronic system; and
  - at least one flat compensator plate, having parallel faces, which may be scanned by nutation to vary the optical path difference<sup>7</sup>.

4. (currently amended) ~~the~~ The spectrometer of claim 1 where the filter is an etalon~~;~~.
5. (currently amended) ~~the~~ The spectrometer of claim 1 where the solid-state laser is a vertical cavity surface emitting laser~~;~~.
6. (currently amended) ~~the~~ The spectrometer of claim 1 where the solid state laser has a linewidth of less than  $\pm$  ~~cm.sup.-1~~ one wavenumber ~~;~~.
7. (currently amended) ~~the~~ The roof reflector assembly of claim 2 where the assembly is machined by wire EDM~~;~~.
8. (currently amended) ~~the~~ The roof reflector assembly of claim 2 where the assembly is fabricated from ceramic~~;~~.
9. (currently amended) ~~the~~ The roof reflector assembly of claim 2 where the reflective coating is prepared by replication~~;~~.
10. (currently amended) ~~the~~ The spectrometer of claim 3 where a second refractive scanning plate is interposed in the first or second beam~~;~~.

11. (currently amended) ~~the~~ The spectrometer of claim 1 where the signal generated by the ~~diode~~ solid-state reference laser is demodulated;.
12. (currently amended) ~~the~~ The spectrometer of claim 1 wherein the detector further comprises a transfer function and wherein an additional source of radiant energy is used to probe the transfer functions of the detector ~~or detectors~~;.
13. (currently amended) ~~the~~ The spectrometer of claim 1 wherein the detector further comprises a transfer function and the transfer function of the detector is inverted by the use of an adaptive filter;.
14. (currently amended) ~~the~~ The spectrometer of claim I where the radiation detector detects an optically subtracted beam;.
15. (currently amended) ~~the~~ The spectrometer of claim 1 further comprising an additional source of radiant energy acting as a signal probe providing a response, and wherein the detector further comprises a detector signal, and whereby the detector signal is modified by the control, data

acquisition and processing electronic system to correct for nonlinear response using the response to a the probe signal.

16. (currently amended) the The spectrometer of claim 2 further comprising an additional source of radiant energy acting as a signal probe providing a response, and wherein the detector further comprises a detector signal, and whereby the detector signal is modified by the control, data acquisition and processing electronic system to correct for nonlinear response using the response to a the probe signal.
  
17. (currently amended) the The spectrometer of claim 3 further comprising an additional source of radiant energy acting as a signal probe providing a response, and wherein the detector further comprises a detector signal, and whereby the detector signal is modified by the control, data acquisition and processing electronic system to correct for nonlinear response using the response to a the probe signal.